

REMARKS

Objections to the Specification

The Examiner's objections to the specification have been obviated by appropriate amendments consistent with the Examiner's suggestion that the entire specification be reviewed and corrected. These amendments have been incorporated in the SUBSTITUTE SPECIFICATION submitted herewith.

No new matter has been included in the substitute specification.

It is respectfully submitted that the current amendments to the specification remove all objections raised by the Examiner regarding the specification.

Objections to the Abstract

The abstract of the disclosure has been amended to comply with the 150 word length limit as required by 37 C.F.R. 1.72(b), thereby obviating the Examiner's objection. Withdrawal of the objection to the abstract is respectfully requested.

Rejection of claim 1 under 35 U.S.C. § 112, first paragraph

Claim 1 currently stands rejected for failing to comply with the written description requirement. Claim 1 has been cancelled, and replaced by new claims 2 and 3, which more clearly recite the inventive subject matter. Applicant respectfully submits that this objection is obviated by the new claims 2 and 3 along with the Substitute Specification submitted herewith. Moreover, it is respectfully submitted that the operation of the mechanical delaying device is readily apparent to one of skill in the art upon review of the drawings along with the specification.

The drawings clearly illustrate the structure of the spindle, pressing member (or paper sensing lever), and arm movable between a first position (wherein the roller or cam follower rests against an outer end of the helical cam), a second position (wherein, upon insertion of a sheet of paper, the roller is fully removed from contact with the helical cam and the spring-biased roller moves to an inward position), and a third position (wherein, upon passage of the paper sheet clear of the paper sensing lever, the roller moves into contact and engagement with the helical cam). Similarly, it is clear

from the illustrations and specification that a delay is effected between movement of the arm from the third position back to the first position as the roller travels outwardly along the helical cam.

Applicant submits that the interaction of the structure of the spindle, pressing member, and arm with a switch to control the motor is well within the knowledge of those skilled in the art, as illustrated and exemplified by U.S. patent nos. 6,827,300, 6,308,904, 6,250,574, 5,984,215, 5,775,605, and 5,167,374, identified in an accompanying form PTO-1449.

It is respectfully submitted that the amendments to claims, along with amendments to the specification, overcome the rejection based on 35 U.S.C. § 112, first paragraph. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection of claim 1 under 35 U.S.C. § 112, second paragraph

Claim 1 currently stands rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claim 1 has been cancelled, and replaced by new claims 2 and 3, which recite the inventive subject matter originally intended by original claim 1. Claims 2 and 3 have been added to express the limitations of the original claim 1 in a manner more consistent with acceptable grammar and practice.

It is respectfully submitted that the amendments to claims overcome the rejection based on 35 U.S.C. § 112, second paragraph. Accordingly, withdrawal of this rejection is respectfully requested.

General Comments

Applicant's invention employs a novel arrangement of a spindle, a paper sensing lever, and an arm in cooperation with a cam follower and a helical cam to achieve a mechanical delay in the operation of a paper shredder, delaying the stopping of the shredder until a paper sheet has passed clear of shredding blades. It is submitted that Applicant's unique combination of these elements is novel and entirely lacking from the teachings, either individually or combined, of any prior art references known to the Applicant.

During the course of preparing this response, Applicant's representative has discovered additional U.S. patents related generally to the field of paper shredders, identified on the accompanying form PTO-1449. Of these, the nearest to Applicant's invention appears to be 6,308,904 which employs a control cylinder to operate a micro-switch in conjunction with a paper sensing element. However, the device of the '904 patent differs from Applicant's invention for at least two reasons.

First, the '904 teaches a significantly more complex structure, having a delaying control cylinder mechanism directly operating a micro-switch and a paper sensing mechanism which also, but separately, directly operates the micro-switch. In contrast, Applicant's helical cam directly controls the spindle, paper sensing lever, and arm structure, resulting in a simpler structure requiring fewer moving parts.

Second, the control cylinder employed in the '904 patent has a notch wherein a micro-switch cantilever comes to rest when the shredder is in the "off" state. Because the micro-switch cantilever rests within the notch, further rotation of the control cylinder, and apparently therefore the driving shredder blade shaft, is prohibited. This arrangement appears to require precise timing in the stopping of the shredding apparatus once the micro-switch reaches the off position, since it appears that any degree of "coasting" after power is removed by the micro-switch might result in damage to the micro-switch, cantilever, control cylinder, or other related components. In contrast, according to Applicant's invention some "coasting" is allowed once the spindle, paper sensing lever, and arm structure is driven by the helical cam into the "off" position since the roller rests against the outermost end of the helical cam but the helical cam remains free to rotate.

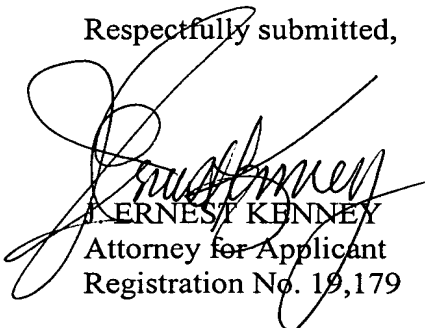
In view of the amendments to the claims, and in further view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is requested that claims 2 and 3 be allowed and the application be passed to issue.

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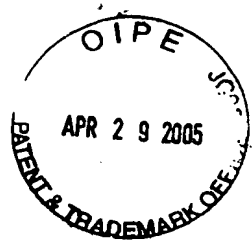
If any issues remain that may be resolved by a telephone or facsimile communication with the Applicant's attorney, the Examiner is invited to contact the undersigned at the numbers shown.

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MECHANICAL DELAYING DEVICE OF SHREDDER

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The invention relates to shredder having a delaying and halting device using a spindle, a roller and a gear axis, and being capable of overcoming drawbacks as short-circuits and malfunctions of prior electronic delaying devices, thereby lengthening lifespan of the shredder.

(b) Description of the Prior Art

Common delaying devices of shredders usually adopt electronic components such as printed circuit boards, sensors and the like. However, these electronic delaying devices frequently result in malfunctions in the shredders due to humidity or poor contacts.

SUMMARY OF THE INVENTION

The primary object of the invention is to provide a shredder having spindle at frames of blade assemblies, a roller or cam follower accommodated around a ~~an~~-axis shaft connected at a bottom portion of a ~~eantilever~~ lever at one end of the spindle, and a projecting helical gear axis or helical cam at an outer side of a fixing plate of the blade assemblies. Using an interlocking relationship by inserting engaging the cam follower with the helical cam ~~roller into gear grooves of the gear axis~~, mechanical delaying and halting purposes are accomplished after inserting paper.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an elevational view according to the invention.

FIG. 2 shows a partial structural view according to the invention.

FIG. 3 shows a partial sectional view of the frame in FIG. 2 according to the invention.

FIG. 4 shows a planar view illustrating the delaying device according to the invention not inserted with paper or having completed shredding.

FIG. 5 shows a motional schematic view of the spindle and the gear axis of the delaying device according to the invention.

FIG. 6 shows a planar view illustrating the delaying device according to the invention inserted with paper.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

To better understand the invention, detailed descriptions shall be given with the accompanying drawings hereunder.

Referring to FIGS. 1 and 2, the invention comprises an upper lid 1, a base 2, a motor 3, a decelerator (or reduction gear set) 4, and two blade assemblies 5 and 6. The upper lid 1 has a feeder 11 and a switch button 12 at a top portion thereof. The base 2 accommodates the motor 3, the decelerator 4, and the two blade assemblies 5 and 6 at an interior thereof, and has a shred container 10 at a bottom portion thereof. The motor ~~[[4]]~~ 3 is for driving and rotating the decelerator 4, which consists ~~consisted~~ of a plurality of gears, and the decelerator 4 is for driving and rotating the two blade assemblies 5 ~~ad~~ and 6, thereby shredding paper. The two blade assemblies 5 and 6 are provided with U-shaped plastic frames 51 and 61 that have openings thereof facing outward, so as to form a long shredder slot 50 connected with the feeder 11 of the upper lid 1. The frames 51 and 61 of the two blade assemblies 5 and 6 are fastened at metal fixing plates 52 and 62 via

two sides thereof, respectively. ~~The characteristics of the two blade assemblies 5 and 6 are that: the~~

~~The~~ frame 61 of ~~the right~~ blade assembly 6 has two ~~axis~~ support bases 611 and 612 for receiving a spindle (or cam following shaft) 7 above ~~;~~ ~~an axis 71 at one~~ One end of the spindle 7 is penetrated into an ~~axis~~ opening 6121 of the axis support base 612, whereas the other end of the spindle 7 is connected to a lever ~~cantilever~~ 72 as shown in FIG. 3. ~~;~~ At a ~~top~~ portion of the spindle 7 near the ~~axis~~ opening 6121 is a pressing member (paper sensing lever) 73, which is tilted downward to extend into the shredder slot 50 of the two blade assemblies 5 and 6, such that when paper is entered into the shredder slot 50, the pressing member 73 is simultaneously pressed downward for driving and rotating the spindle 7. A ~~;~~ a bottom portion of the ~~cantilever~~ lever 72 ~~at one end the spindle 7~~ is connected with a transverse ~~axis~~ shaft 721 accommodated by a circular roller (or cam follower) 8. An ~~;~~ a rear end of the ~~axis~~ shaft 721 is fastened with a circular baffle 74 using a screw bolt 741, and ~~[[;]]~~ the roller 8 and the baffle 74 are ~~accommodated~~ separated by a spring 81 in between such that the roller 8 is allowed with displacement by pressing against the spring 81 as shown in FIG. 3. Extending from an ~~;~~ an outer side of the fixing plate 51 of the blade assembly 6 is a projecting helical gear (or helical cam) ~~axis~~ 9, which is connected to and rotates ~~spontaneously moves with an axis of~~ the blade assembly 6. Gear ~~;~~ and gear grooves 91 on at the helical gear ~~axis~~ 9 are for placing the roller 8.

Referring to FIGS. 4 and 5, when paper P is not inserted, the roller 8 is pressed against the spring 81 and blocks at (is retained against) an outer side of the gear ~~axis~~ 9, locating the lever 72 in a first position. When ~~the~~ a paper

P is inserted, the paper P downwardly presses the pressing member 73 that further ~~drives and~~ rotates the spindle 7 ~~below~~. Referring to FIG. 5, the roller 8 is displaced outward or upward by the paper P so as to depart from the gear axis 9, locating the lever 72 in a second position, and a ~~A~~ restoring force or bias of the spring 81 pushes the roller 8 inward to the position ~~with a section at a time as shown in FIG. 6.~~ It can be seen with reference to Fig. 5 that, with the lever 72 in the first position, the roller 8 is fully clear of the gear 9. When the paper P clears the pressing member 73 the spindle 7 rotates to bring the lever 72 into a third position wherein the roller 8 engages with the gear 9. ~~Referring to FIG. 4, the~~ The roller 8 is stretched into ~~biased into~~ engagement with the gear grooves 91 of the gear axis 9, and is pushed toward an outermost end of the gear axis 9 ~~by along with~~ rotation of the gear axis 9 ~~by the axis of the shredding blade assembly 6,~~ returning the roller 8 to the position of Fig. 4. At this point, the shredder comes to a halt for having completed shredding, thereby accomplishing the objects of delaying, as the roller 8 travels along the gear 9, and halting. Operation of an electrical switch, such as a microswitch, by a member such as the pressing member, a portion thereof, or a member in connection with the pressing member to switch the paper shredder on and off is well known in the art and is exemplified in U.S. patent nos. 6,827,300, 6,308,904, 6,250,574, 5,984,215, 5,775,605, and 5,167,374.

Conclusive from the above, the invention utilizes an interlocking relationship between the spindle 7, the roller 8 and the helical gear 9 axis for accomplishing delaying and halting of the shredder, and advances over drawbacks such as

short-circuits and malfunctions of electronic sensors and printed circuit ~~bears~~ boards in the prior shredder.

It is of course to be understood that the embodiment described herein is merely illustrative of the principles of the invention and that a wide variety of modifications thereto may be effected by persons skilled in the art without departing from the spirit and scope of the invention as set forth in the following claims.